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USER MANUAL R220U

AIS Dual Channel Parallel Receiver
with NMEA 0183 in/out and USB

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1 R220U AIS DUAL CHANNEL PARALLEL RECEIVER



Front Left View, showing power, antenna and data connections

Front Right View, Showing LEDs and USB port



2 DOCUMENT

2.1 About This Manual

This Manual provides installation, operating Instructions and fault-finding procedures for the equipment to which it relates.

After installation, this manual should remain with the vessel to which it relates.

This manual may also be made available in electronic Portable Document Format (PDF). In PDF format, the following categories are all enabled as active hyperlink references: (1) The titles of each section; (2) document cross-references; (3) the table of contents.

This document may therefore be navigated quickly and effectively by using a mouse or other pointing device to activate each of these hyperlinks. This is a printer friendly document, designed to be printed 2-sided as a booklet with A5 pages on A4 stock paper.

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3 NOTICE

3.1 Copyright

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4 GENERAL NOTICES

-  SAFETY: Make sure the power supply is switched off before you make any electrical connections to the unit.
-  INSTALLATION: This equipment must be installed in accordance with the instructions provided in this manual. Failure to do so could result in poor performance, personal injury and/or damage to your vessel and/or connected equipment.
-  CONNECTION: To ensure the performance of the unit, as part of the installation it is recommended that adequate grounding is connected to the unit. Further to this, it is recommended that the power input supply is provided by a clean DC source with filtering if required.
-  CABLES: The supplied cables should only be cut, shortened or lengthened by an appropriate supplier.
-  COMPASS: The compass safe distance of this unit is 0.5 m or greater for 0.3° deviation.

In accordance with a policy of continual development and product improvement, hardware and software may be upgraded from time to time, and future versions of equipment may therefore not correspond exactly with this manual.

When necessary, upgrades to the product will be accompanied by updates or addenda to this manual. Information contained in this manual is liable to change without notice.

Comar Systems Ltd. disclaims any liability for consequences arising from omissions or inaccuracies in this manual and any other documentation provided with this product.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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5 INTRODUCTION

5.1 Background to AIS

AIS is an Automatic Identification System. For improved safety and specifically for collision avoidance reasons, vessels need to know the position, details and navigational intentions of other vessels within VHF range.

IMO regulations covering most commercial vessels worldwide have been passed requiring that AIS transponders are fitted to all commercial vessels over 300 grt on international voyages.

The transponders use VHF frequencies to:

Transmit details of their own vessel

Receive details from other vessels or navigation aids within VHF range

5.2 The R220U

The R220U is a high performance, dual channel AIS receiver, with outputs for both NMEA 0183 and USB. The R220U reads and decodes all AIS messages that are specified and transmitted by AIS Class A and Class B transponders, AIS SARTs and Aids to Navigation. The AIS targets together with all the static and dynamic information received can be displayed on any AIS compatible Chart Plotter or PC navigation program.

The unit can be operated in various modes to suit your application. If connected solely by a USB cable to a PC, the unit is powered by the PC and data is transmitted via the USB cable providing a compact solution. Whilst powered by the USB, NMEA 0183 output is also available from the data port. NMEA 0183 Input from a GPS can also be connected via the Data input which is multiplexed with the AIS data to provide position information to the PC.

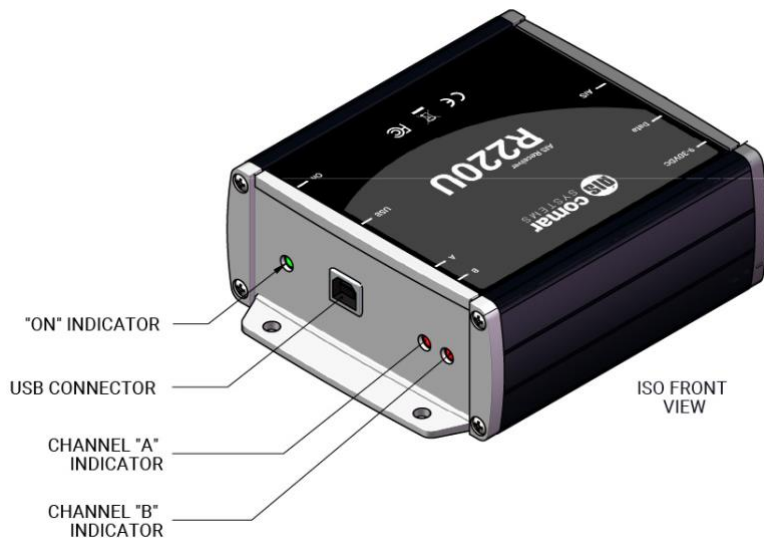
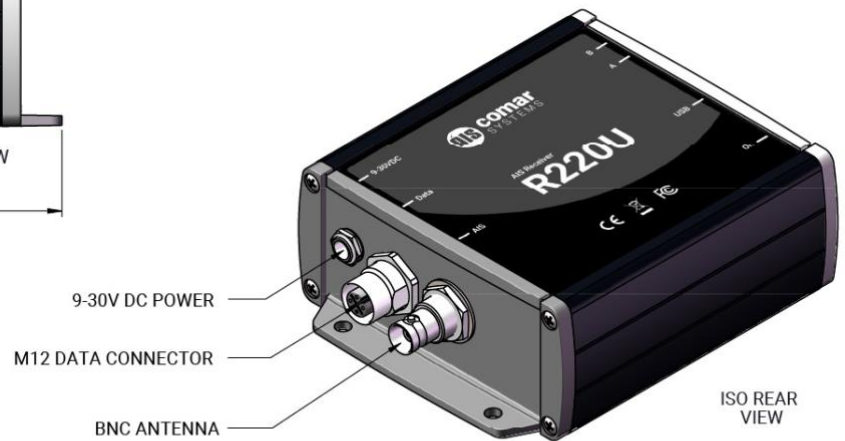
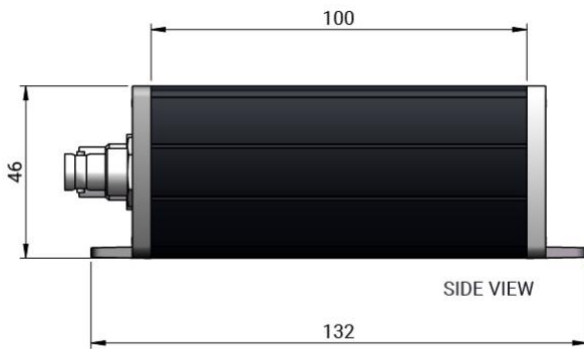
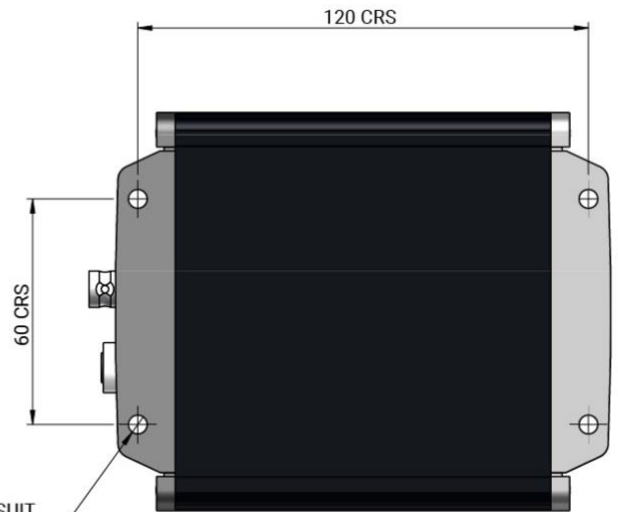
Connecting the unit to external 12/24VDC will automatically power the device from the boat's batteries and provide both USB and NMEA 0183 data.

Information transmitted from vessels fitted with AIS transponders includes:

- Name of Vessel
- Speed (SOG)
- Position
- MMSI Number
- Rate of Turn
- Destination
- Call Sign
- Course (COG)
- Navigational Status
- IMO Number
- Size of Vessel
- ETA
- Type of Vessel
- Heading
- Vessel Dimensions
- Draft
- Status
- Cargo

6 MAJOR DIMENSIONS

Dimensions in mm



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7 PARTS LIST

- The R220U AIS Receiver Unit
- Universal 100-250VAC/12VDC Power Supply
- Antenna Connector Adaptor
- Data Cable
- USB Cable
- R220U Installation CD
- This Manual

8 INSTALLATION

8.1 Mounting

All R220U is not waterproof and should be installed in a dry location, ideally in a location suitable for connection to power and a VHF antenna, observing a compass safe distance of 0.5m and away from excessive heat sources and high levels of vibration and shock.

8.2 Power Connection

Fit the universal power supply with the correct adaptor for your local power. Plug the 2.1 mm jack into the rear of the R220U unit and switch on the power

Hint: Alternatively the unit will accept 9-30 V dc from an alternative source capable of supplying 1 Amp. The centre pin is Positive.

8.3 Antenna Installation

A VHF antenna is not supplied as the type of antenna and cable requirements differ for each installation. An antenna can be acquired from a local marine electronics outlet.

Shore based reception is governed by local terrain, however an open view to the sea with an antenna mounted in the clear at a height of approximately 20 metres will achieve 25 miles plus.

Hint: The antenna connector type is BNC, 50Ω

Hint: The higher the antenna is located, the greater the range

Hint: Mount the antenna with a relatively clear view of the horizon. Large obstructions that might shade the antenna should be avoided.

Hint: A higher gain antenna will increase reception range.

Hint: Normally an omni-directional antenna is recommended; however a directional antenna such as a 3 element Yagi can be used to increase range in one particular direction.

9 OPERATION

On applying power, the green ON LED will light and the two red channel A and B LEDs will come on for approximately 10 seconds. If the unit is within VHF range of other AIS equipped vessels, the red channel A and B LEDs will flash randomly.

If the unit is connected solely by the USB cable to a computer, this will power the unit and also transfer data. Install the USB Drivers on the supplied CD and select the com port on your PC which this device is allocated to.

Connecting external 12/24V dc to the unit will automatically switch the power source from the USB to external power; the USB will still output data.

The NMEA output at 38,400 is available at all times whether the unit is on USB power or external power.

NMEA data at 4800 on the input will be multiplexed by the unit and output to the NMEA output port and the USB data cable.

9.1 Range of AIS

The AIS reception range is similar to that normally associated with Marine VHF Radiotelephone. Range is dependent on height of antenna and also type of antenna, the higher and better antenna installed the greater the reception range.

Typically an antenna mounted on the rail of a yacht will achieve 15 miles, mounted on the masthead will increase this to 20 miles. Shore based reception is governed by local terrain, however an open view to the sea with an antenna mounted in the clear at a height of approximately 20 metres will achieve 25 miles plus, higher gain antenna can be used on shore to further increase the range.

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10 NMEA CONNECTION

The R220U M12 connector has one NMEA 0183 Output at 38,400 baud, and one NMEA Input at 4800 baud.

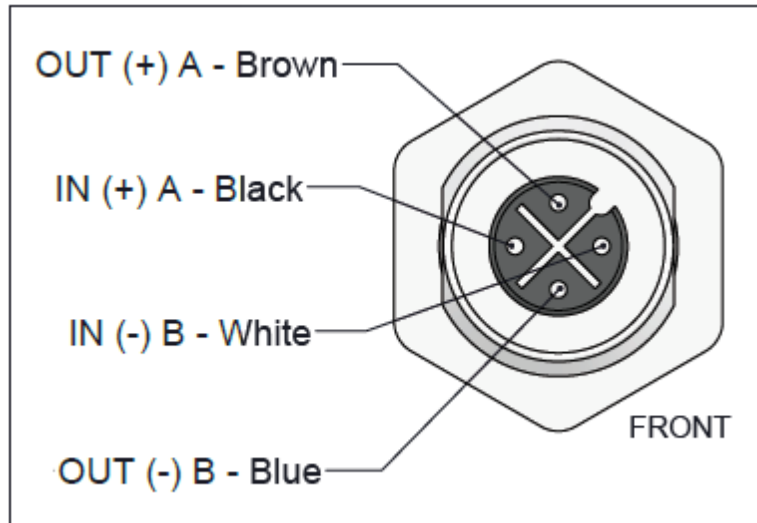
The NMEA output is set to 38,400 baud and can be connected to a suitable Chart Plotter that will accept AIS data in.

If the equipment that you are connecting to has a pair of NMEA cables, normally marked NMEA Input Positive and Negative these should go to the respective NMEA output on the R220U unit.

If the equipment has only one (Positive) +NMEA Input wire, this should go to the +NMEA Output and the wire from the -NMEA output should then be taken to the common ground/negative of the other equipment.

Any 4800 baud NMEA data such as that from a GPS, Chart Plotter or Instruments can be connected to the NMEA input, observing the correct polarity in the figure below. This data will be multiplexed with the AIS data and sent out at 38,400 baud.

The unit can only be connected to one item of equipment, so choose the unit that has the most information that you require, normally a GPS.



M12 Data Connector Wiring Diagram

11 TROUBLESHOOTING

11.1 No power LED is displayed

Check the power supply and that the unit is connected correctly to a 12 or 24V dc supply

Check the polarity of the supply is correct. The center pin of the 2.1mm jack is positive

11.2 Channel 1 and Channel 2 LEDs do not flash

Check that a VHF antenna is fitted and correctly connected

Check that the antenna is correctly positioned, i.e. at a suitable location to visibly 'see' vessels

11.3 Channel 1 and Channel 2 lights flash, but no data is received

If the red channel lights flash then data is being received from nearby vessels.

Check that the correct data cable is connected to the PC or NMEA device

Check on the PC application or device that the correct port is assigned and the correct baud rate is setup. The correct baud rate is 38,400

11.4 I can receive ships on my display, but no names are shown

Remember that the names of ships as well as other static information are only sent every 6 minutes or when requested by another station

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12 SPECIFICATION

12.1 Electrical	
Power Supply Range:	9 - 30 Volts dc
Power Consumption:	300mA @ 12 V dc
Baud Rate:	38,400 Baud (38.4Kb)
Format:	ITU / NMEA 0183
Output Message:	AIS: VDM
Input:	NMEA 0183 at 4800
Output:	NMEA 0183 at 38,400 or USB
12.2 Receiver	
Frequency:	Channel A 161.975 MHz Channel B 162.025 MHz
Channel Spacing:	25 kHz
Sensitivity:	> -112 dBm @ 20% MER
Demodulation:	GMSK
Data Rate:	9600
Antenna Impedance:	50 Ω
12.3 Physical	
Dimensions:	L132 x W106 x H46 mm
Weight:	600 g
Mounting:	4 mounting holes in end plates
Connections:	AIS Antenna BNC M12 Data Connector (NMEA 0183)
USB Port:	USB 2.0 Type B (Cable Supplied)
Power:	2.1 mm Phono plug
Indicators:	On (Green), Channel A (Red), Channel B (Red)
Construction:	Aluminium, ABS End Caps
Finish:	Black Fine Texture Paint, Grey ABS

13 LIMITED WARRANTY

Comar Systems Ltd warrants this product to be free from defects in materials and manufacture for one year from the date of purchase. Comar Systems Ltd will, at its sole option, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts and labour. The customer is, however, responsible for any transportation costs incurred in returning the unit to Comar Systems Ltd.

This warranty does not cover failures due to abuse, misuse, accident or unauthorised alteration or repairs.

The above does not effect the statutory rights of the consumer.

Changes or modifications not made by Comar Systems or an authorised repairer will: (1) Void the warranty issued by Comar Systems (2) Void the user's authority to operate the equipment.

Note: Every effort has been made to ensure that all information contained in this manual is accurate at the time of going to press. We therefore cannot take any responsibility for the content of this manual and advise that you take normal steps to ensure that the information is at its most current when you are reading this manual.



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